

REPORT SUMMARY

Town of Bloomsburg, Columbia County, Pennsylvania Flood Damage Reduction Project Integrated Feasibility Report & Environmental Impact Statement

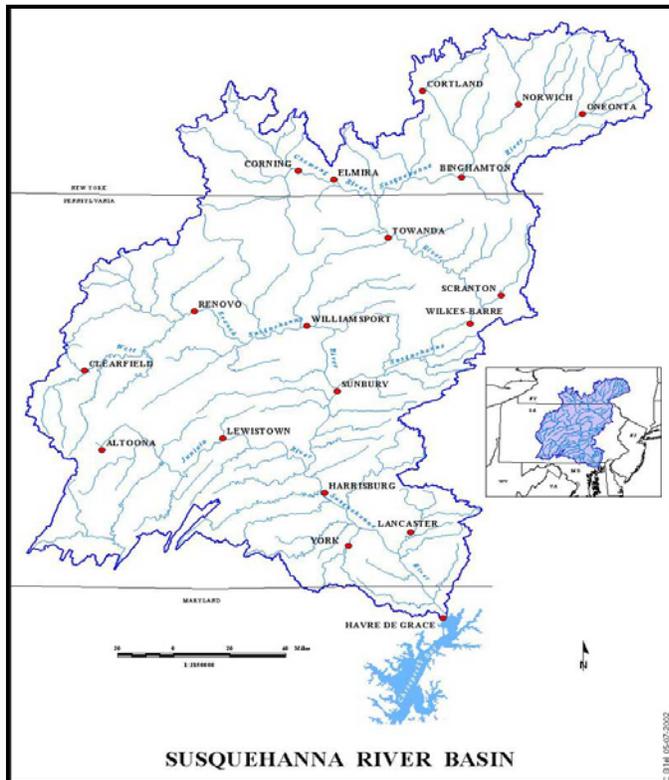
STUDY INFORMATION

Study Authority. The feasibility study was authorized by a resolution of the Committee on Transportation and Infrastructure of the U.S. House of Representatives, adopted 12 September 1996, which reads: *“Resolved by the Committee on Transportation and Infrastructure of the United States House of Representatives, That, the Secretary of the Army review the report of the Chief of Engineers on the Susquehanna River, New York, Pennsylvania and Maryland, published as House Document No. 702, 77th Congress, to determine whether flood damage reduction measures should be implemented in the Town of Bloomsburg, Pennsylvania,....”*

Study Sponsor. The non-Federal cost sharing sponsor for this study is the town of Bloomsburg, Pennsylvania. The Pennsylvania Department of Environmental Protection (PA DEP) provides 50 percent of the non-Federal share of project costs, under a sub-agreement with the town.

Study Purpose and Scope. The report is an interim response to the study authority. The report documents the results of the Feasibility Study to identify an implementable solution to flooding problems and to determine the extent of Federal participation in a flood damage reduction project

along the Susquehanna River and Fishing Creek at Bloomsburg. The report has been written as an integrated feasibility report (FR) and environmental impact statement (EIS), which reflects an integrated planning process where adverse environmental effects associated with flood damage reduction have been avoided, minimized, and mitigated. As an integrated report, this FR/EIS also fully document compliance with all requirements of the National Environmental Policy Act (NEPA).



Project Location/Congressional District. Bloomsburg is located in Columbia County within the Middle Susquehanna River sub-basin in northeastern Pennsylvania. The Susquehanna River forms the Town's southern boundary, and Fishing Creek forms the northern and western boundaries. Extensive portions of

the Bloomsburg study area are within the 500-year floodplain of the Susquehanna River and Fishing Creek. The floodplain includes approximately 525 residential structures, and 75 businesses and local government buildings. The study area is located within the 11th Congressional District of Pennsylvania and is represented by Paul E. Kanjorski. The Senators from Pennsylvania are Arlen Specter and Rick Santorum.

Prior Reports and Existing Water Projects. The Bloomsburg area has been the subject of several Corps studies. The first USACE report documenting Bloomsburg's flood problems was submitted to Congress in December 1934 showing insufficient economic justification. The area was re-evaluated in 1942, 1956, 1970 and 1980, with insufficient economic justification each time. In 1979, the Federal Emergency Management Agency's Federal Insurance Administration (FIA) completed a flood insurance study of Bloomsburg in order to convert Bloomsburg to the regular program of the National Flood Insurance Program (NFIP). Also that year, the Fernville-Scottown Survival Committee, a citizens flood control group in Bloomsburg, hired a consulting engineer to develop a flood control plan for the Bloomsburg side of Fishing Creek. In 1983, the Corps completed a Section 205 reconnaissance study. Because previous USACE studies had found that providing flood protection for the entire town lacked economic justification, and that nearly all of the expected annual damages for the Town were found to occur in the area between Fishing Creek, the Susquehanna River, and Railroad Street, this study focused on providing protection for this more downstream, western end of the Town. The study evaluated three structural alternatives, including the plans identified in the 1979 consultants report, but none was found to be economically feasible. A second Section 205, Initial Appraisal, was conducted in August 1994. By the early 1990s, changes to existing conditions in the study area prompted the Town to request a new USACE study to assess Federal interest. This time, the study concluded that existing conditions had changed enough that a new reconnaissance study should be pursued under the General Investigations Program. A section 905(b), WRDA 1986, Reconnaissance Study, was completed in May 1998. This study concurred that there was a chance for an economically-justified project. Based on this, the Town and USACE executed a Feasibility Cost Sharing Agreement in June 1999 to complete a feasibility study.

Army Corps of Engineers dams detaining Susquehanna River floodwaters upstream of Bloomsburg include:

- Almond Dam, located about 2 miles northwest of Hornell, NY, on Canacadea Creek;
- Arkport Dam, located in Steuben County, NY, on the Canisteo River about 1 mile west of the village of Arkport and 5 miles upstream of Hornell, NY;
- Aylesworth Creek Lake, located on Aylesworth Creek in Lackawanna County, PA, about 10 miles upstream from Scranton, PA
- Cowanesque Lake, located on the Cowanesque River approximately 2 miles above the confluence with the Tioga River at Lawrenceville, PA.
- East Sidney Lake, located on Ouleout Creek in Delaware County, NY;
- Stillwater Reservoir, located about 9 miles north of Carbondale, PA, on the Lackawanna River;
- Tioga-Hammond Dams (two structures); located about 20 miles southwest of Elmira, NY, on the Tioga River and Crooked Creek; and
- Whitney Point Dam, located on the Otselic River in Broome County, NY.

Other recently constructed or ongoing projects being constructed in the Susquehanna River watershed in Pennsylvania include:

- Wyoming Valley. After Tropical Storm Agnes in June 1972, the U.S. Congress authorized that the level of protection provided by the existing Wyoming Valley levee system be raised to provide protection against a recurrence of Agnes. The levee and floodwall raising was completed in January 2003, but construction of related project elements is ongoing.
- Scranton. A flood control project at Scranton is currently in the construction phase. The Scranton project will provide a 100-year level of protection from flooding on the Lackawanna River, a major tributary to the Susquehanna River. The first reach of the Scranton project provides protection for the Albright Avenue area of Scranton, and was completed in 2003. Construction completion of project reaches in Plot and Green Ridge is scheduled for 2007.
- Olyphant. Upstream of Scranton, construction for the Olyphant flood protection project is complete. Like Scranton, the project provides a 100-year level of protection from the Lackawanna River.

Federal Interest. The proposed project for the town of Bloomsburg provides flood damage reduction benefits through the construction of features to reduce damages from overbank flooding from the Susquehanna River and Fishing Creek. The recommended plan demonstrates Federal interest as shown by the net National Economic Development benefits. Average annual project benefits are estimated at \$3.7 million. Average annual project costs are estimated at \$2.6 million, resulting in average annual net benefits of \$1.1 million and a favorable benefit to cost ratio of 1.4 to 1. Providing Bloomsburg with a flood damage reduction project would contribute to the protection of life, and to the reduction of recurrent physical and environmental damage that hinders contributions to the national economy. The recommended project has been shown to be environmentally sound as evidenced by the environmental impact analysis incorporated into the report.

STUDY OBJECTIVES

Problems and Opportunities. The primary water resource problem along the Susquehanna River at Bloomsburg is recurrent flooding. Since the early 1800's, the river has flooded, on average, once every twenty years. In the Bloomsburg area, the Susquehanna River has very little slope and shallow banks. Therefore, when storms occur, the river is slow to recede, causing the River floodwaters to flow upstream and overtop the banks of Fishing Creek. Normal discharge from Fishing Creek to the main stem of the river is also hindered and exacerbates the backwater flooding. When the Susquehanna River and Fishing Creek simultaneously rise above flood stage, overbank flooding can cover up to 33 percent of the land mass within the Town's boundaries, resulting in extensive damages to structures, water and sewer services and transportation systems. Therefore, any solution must be able to provide protection from the River and from backwater flooding along Fishing Creek.

Planning Objectives. As defined in the Principles & Guidelines, the Federal objective of water and related land resources project planning is to contribute to National Economic Development (NED) consistent with protecting the Nation's environment, pursuant to national environmental

statutes, applicable executive orders, and other Federal planning requirements. For Bloomsburg, a specific objective addressed in the report is to reduce the adverse impacts of flooding from the Susquehanna River and Fishing Creek on the Town. In pursuit of the project goal, the following planning objectives were established:

- Provide protection from frequent, low-level recurring floods.
- Reduce the frequency and severity of flood damages incurred as a result of backwater flooding from the Susquehanna River through Fishing Creek.
- Reduce the frequency and severity of flood damages incurred as a result of mainstem flooding from the Susquehanna River.
- Mitigate for any hydraulic impacts.
- Maintain community cohesion.

Planning Constraints. The formulation and evaluation of alternative plans was constrained by a variety of technical, economic, environmental, social, and institutional considerations. Technical constraints include the need for plans to be sound, safe, and acceptable; in compliance with sound engineering practice; realistic and state-of-the-art; consistent with existing local plans; and complete (that is, not dependent on future projects). Environmental constraints include avoiding or minimizing adverse environmental impacts; limiting structural alignment impacts to closed landfills; and limiting impacts to prime and unique farmland. Economic constraints include: the need for flood damage reduction features to be efficient (that is, average annual benefits must exceed average annual costs) and the requirement to select the flood damage reduction plan that maximizes net excess NED benefits; that is, the NED plan. Regional and social constraints include the need for plans to: weigh the interests of State and local public institutions and the public at large, and consider the potential impacts of the project on other areas and groups. Institutional constraints include the need for plans to: be consistent with existing Federal, State and local laws; be locally supported; provide public access to the project in accordance with Federal/State laws and regulations; and find overall support in the region and State.

ALTERNATIVES

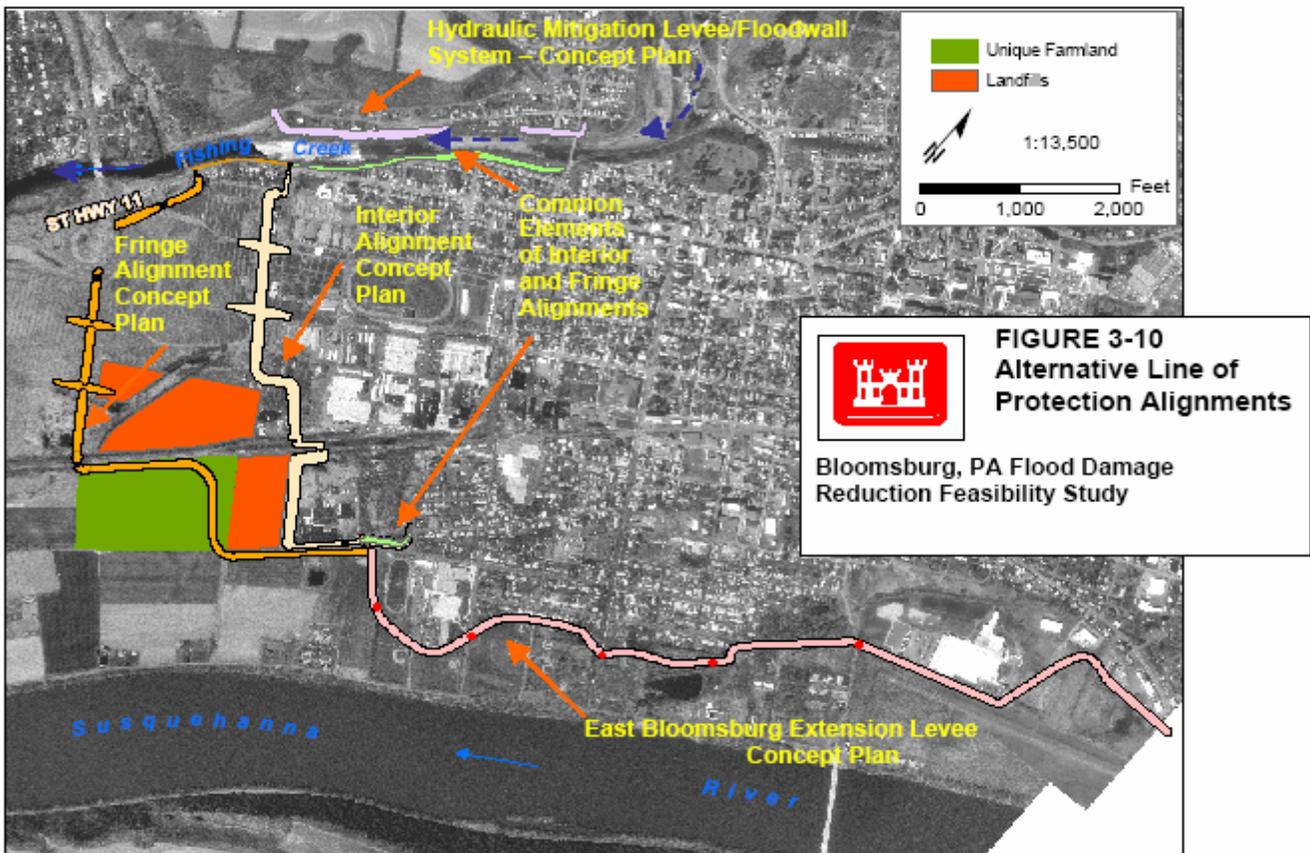
Plan Formulation Rationale. Planning followed the principles identified in the Water Resources Development Act of 1986 and subsequent WRDA acts, and *Engineering Regulation 1105-2-100, Policy and Planning, Planning Guidance*. Alternative plans were developed based on local knowledge of the flooding problem, an understanding of the consequences of previously-investigated flood control alternatives, and an understanding of local sensitivities about project goals and objectives.

Management Measures and Alternative Plans. In the early stages of plan formulation, with a desire to seek less-invasive solutions, non-structural measures (acquisition of flood-prone property, floodplain zoning, floodproofing, and flood warning systems) were considered but screened out as stand-alone measures to reduce flood damages due to prohibitive costs or ineffectiveness. Subsequently, a number of structural measures were considered, evaluated, re-evaluated and refined based on input from the study team, the local Sponsor team, the public and public resource agencies.

The following structural measures were considered and evaluated: (1) stream modifications, such as channel deepening and widening, modification of bridge and culvert openings, and dredging, (2) detention basins that would store large volumes of water, and then release them at a controlled rate, and (3) floodwater barriers, such as levees, floodwalls, and mechanically-stabilized earth (MSE) walls that confine flood flows to the existing channel footprint and prevent breakout of floodwaters. The type of floodwater barrier is usually a function of available space, cost of real estate, and the desire to avoid or minimize adverse impacts to affected properties.

Of the solutions considered, floodwall barriers were the most viable and sustainable solution to meet defined objectives. Towards that end, the following alignments were developed as a baseline to determine viable preliminary alternatives: (1) interior alignment, (2) fringe alignment, and (3) east Bloomsburg extension alignment. (See figure – Alternative Line of Protection Alignments).

Interior alignment. The Interior Alignment is 9,100 linear feet long and consists of earthen levee, MSE wall, and concrete floodwall. The Interior Alignment was positioned as a setback levee along Fishing Creek (south of Route 11), and would cover the shortest distance across the Fairgrounds parking area to provide a line of protection. The setback feature provides a flow area for floodwaters and minimizes the level of increased flooding to property located on the right descending bank of Fishing Creek. While the design of the Interior Alignment provides an efficient floodwater flow area, potential problems include: the likelihood of encountering



hazardous, toxic, and radiological waste (HTRW) since the alignment runs along the borders of two known closed landfills; extensive excavation would be required to reach a depth where foundation suitable soil would be present; there is extremely limited space to shift the interior alignment to avoid these landfills without severely disrupting operations for two key industries nearby; and not providing protection for sixteen residential and two commercial structures located immediately west of the main Fairground entrance on Route 11.

Fringe alignment. The overall length is 12,450 linear feet, consisting of earthen levee, MSE wall, and concrete floodwall. The Fringe Alignment provides protection for the same area as the Interior Alignment but also protects the sixteen residences and two commercial properties not protected by the Interior Alignment. Furthermore, the Fringe Alignment maintains some flexibility to avoid known landfills.

East Bloomsburg Levee Extension. The East Bloomsburg Levee Extension, comprised of 9,300 linear feet of earthen levee and closure structures, would provide protection to a relatively large area where a majority of residential and non-residential structures are located at elevations above the 100-year floodplain.

Final Array of Alternatives. Nine alternatives were developed based on information about how historical floods behaved, the areas subject to inundation from the 100-year frequency flood, and local sponsor input. Each alternative includes a type of floodwater barrier and either additional protection or property acquisition as proposed mitigation for adverse hydraulic impacts. For the purposes of preliminary evaluation to screen alternatives, the 100-year event was used to determine the top-of-protection elevations for all alternatives.

Alternative 1: No Action.

Alternative 2: Fringe Alignment at a 100-year level of protection; East Bloomsburg Extension at a 100-year level of protection; Hydraulic Mitigation Acquisition.

Alternative 3: Fringe Alignment at a 100-year level of protection; East Bloomsburg Extension at a 100-year level of protection; Hydraulic Mitigation Levee/Floodwall System at a 100-year level of protection; Hydraulic Mitigation Acquisition.

Alternative 4: Fringe Alignment at a 100-year level of protection; Hydraulic Mitigation Levee/Floodwall System at a 100-year level of protection; Hydraulic Mitigation Acquisition.

Alternative 5: Fringe Alignment at a 100-year level of protection; Hydraulic Mitigation Acquisition.

Alternative 6: Interior Alignment at a 100-year level of protection; East Bloomsburg Extension at a 100-year level of protection; Hydraulic Mitigation Acquisition.

Alternative 7: Interior Alignment at a 100-year level of protection; East Bloomsburg Extension at a 100-year level of protection; Hydraulic Mitigation Levee/Floodwall System at a 100-year level of protection; Hydraulic Mitigation Acquisition.

Alternative 8: Interior Alignment at a 100-year level of protection; Hydraulic Mitigation Levee/Floodwall System at a 100-year level of protection; Hydraulic Mitigation Acquisition.

Alternative 9: Interior Alignment at a 100-year level of protection; Hydraulic Mitigation Acquisition

Comparison of Preliminary Alternatives. Because each alignment provides a single line of protection, the Interior Alignment and the Fringe Alignment could each be constructed as individual flood damage reduction projects. The East Bloomsburg Levee Extension is considered a separable element and, therefore, must be incrementally justified. With a benefit-to-cost ratio (BCR) for the East Bloomsburg Levee Extension at 0.43 to 1.0, it is not economically justified. Alternatives 2, 3, 6, and 7 were eliminated because they were not economically justified with the East Bloomsburg Levee Extension. Of the remaining alternatives, Alternative 4 provides the greater net benefits. Therefore, the Net Economic Development (NED) Plan is Alternative 4 which provides the highest benefit-to-cost ratio of 1.6 and the highest net benefits of \$1,128,000. Table 1 depicts the nine alternatives, replete with the discrete and annual benefits and costs for each, and the BCR.

Table 1 - Preliminary Economic Evaluation of Alternative Plans
(March 2004 price levels, 50-year period of analysis, \$ thousands)

	Alternative Plans							
	2	3	4	5	6	7	8	9
Annualized Cost	3,643	3,116	1,907	2,399	3,651	3,165	1,955	2,443
Annual Benefits	3,586	3,553	3,034	3,067	3,604	3,572	3,053	3,085
Remaining Damages	1,016	1,048	1,567	1,535	998	1,030	1,549	1,517
Benefit-to-Cost Ratio	1.0	1.1	1.6	1.3	1.0	1.1	1.6	1.3
Net Benefits	(57)	438	1,128	667	(48)	407	1,097	641

Each of the final set of alternatives were compared and ranked against the Planning Objectives identified previously. Besides being the plan that maximizes net benefits, only alternative 4 met all of the objectives. Therefore, alternative 4 was selected as the recommended plan.

NED Plan Optimization. To ensure that the final NED plan recommends the most cost-effective alternative, the costs and benefits at different levels of protection for this selected plan were then analyzed. The four levels considered were:

- 50-year level of protection from Fishing Creek and the Susquehanna River;
- 100-year level of protection from Fishing Creek and the Susquehanna River;
- 500-year level of protection from Fishing Creek and the Susquehanna River; and
- Agnes-level (440-year) protection from the Susquehanna River and 100-year level of protection from Fishing Creek.

Based on these analyses, the level of protection with the greatest net benefits is the levee/floodwall system that would provide protection from a Hurricane Agnes-level (440-year) storm on the Susquehanna River and 100-year storm on Fishing Creek. Consequently, this level of protection for alternative 4 is the recommended plan.

Key Assumptions. Underlying assumptions key to the formulation and recommendation include the following:

- Subsurface soils on the Fernville-side of Fishing Creek do not vary substantially from the subsurface soils on the Town-side of Fishing Creek.
- The alignment can be adjusted slightly, if necessary, to avoid contaminated materials without significantly changing top-of-protection elevations or alignment features.
- No significant mitigation will be required for any archaeological, cultural, or environmental resource beyond what has been assumed in the project cost estimate.

Recommended Plan. The recommended plan consists of a series of floodwater barriers that provide protection from a Hurricane Agnes-level storm (440-year return frequency) to low lying areas of the town of Bloomsburg between the Susquehanna River and Fishing Creek. Additional structural protection is provided against a 100-year storm to mitigate induced flooding to Fernville on Fishing Creek. The plan consists of approximately 17,570 linear feet of levees and floodwalls with fourteen drainage structures, limited road raisings, eight closure structures, upgrades to the existing flood warning system, and mitigation.

Bloomsburg is provide a roughly U-shaped line of protection which begins at high ground near Railroad Street and Fishing Creek. The project follows parallel to Fishing Creek and downstream to a point where Route 11 enters Bloomsburg and consists of approximately 1,870 feet of earthen levee, 760 feet of mechanically stabilized earth (MSE) floodwalls, and 1,140 feet of concrete floodwalls. From the end of the concrete floodwall section the structure consist of earthen levee and proceeds approximately 7,730 feet through the fairgrounds and upstream along the Susquehanna River to high ground at West 11th and Barton Streets near the Bloomsburg Middle/High School. The earthen levees will have a crest width of 10 feet and range in elevation from 493.3 feet at the upstream end to 486.2 feet downstream along Fishing Creek and the Susquehanna River segments. Landside slopes will be 2.5 horizontal to 1.0 vertical. Waterside slopes along Fishing Creek will be 2H/1V and be protected with a layer of riprap. Waterside slopes along the Susquehanna River will be 2.5H/1V.

Construction of the levee/floodwall system in Bloomsburg, has the adverse result of increasing flooding levels in the neighborhood of Fernville. To mitigate for these adverse effects, a system of levees and floodwalls are included on the right bank of Fishing Creek. The structure alignment starts with an earthen levee at the east side of Bloom Street and follows Fishing Creek downstream to the where it is tied into high ground just north of Hemlock Street. The structures will have comparable heights to the structures on the Bloomsburg side of Fishing Creek. The levees will have a crown width of 10 feet and 2.5H/1V slopes on the landward side and 2H/1V slope on the water side. The both the upstream and downstream portions of the levee will have riprap protection on the waterside slope. In addition, the creek bank in the downstream levee section will also be protected by riprap.

Construction of the levee system would require construction of nine drainage structures in Bloomsburg and five in Fernville. These drainage structures would permit interior surface runoff and pipe flow from the existing storm water sewer and low areas to cross the line of protection.

The drainage structures would consist of a concrete outlet structure with a flap gate, a control manhole with a sluice gate, and reinforced concrete pipe.

There are a total of eight closure structures and seven road raisings/ramps associated with the levees and floodwalls. Bloomsburg features include seven closure structures and five road raises (ramps) for roads/railroad crossing the line of protection, including:

- An 11-foot-high road raise and a 3-foot-high sandbag closure at Railroad Street;
- A 12-foot-high stop log closure at Route 11 and West 2nd Street;
- An 8.5-foot-high “Y”-shaped road raise and a 3-foot-high sandbag closure for the Fairground access and River Road;
- An 8.5-foot-high road raise and a 2-foot-high sandbag closure for River Road at a second location;
- A 13-foot-high road raise and a 3-foot-high jersey wall closure for the Fairground Parking Access;
- An 11-foot-high miter gate across the railroad, and;
- A 10-foot-high road raise and a 3-foot-high sandbag closure for West 11th Street.

Fernville features include one closure structure and two road raises (ramps) crossing the line of protection, including:

- An 8-foot-high road raise and a 5-foot-high stop log closure for Bloom Street, and;
- A 14.5-foot-high “Y”-shaped road raise for Hemlock and Drinker Streets.

As part of the recommended plan, upgrades to the existing flood warning system include a river gage along Fishing Creek, upgrading an existing river gage on the Susquehanna River upstream of the project area, rain gages (as needed) in the Fishing Creek watershed and radio towers and telemetry equipment to provide alerts regarding high-water events. These upgrades would serve to determine evacuation procedures and actions necessary to ensure closure structures are in-place and functional. This network would supplement and work in association with the existing flood warning network maintained by the Commonwealth.

Construction of the NED plan will require the unavoidable filling of approximately 0.7 acres of wetlands. To offset this impact, approximately 1.1 acres of non-wetland area will be graded to retain surface water and planted with native wetland trees and shrubs. The replacement wetlands will be monitored up to five years for sustainability.

In addition, up to three thousand linear feet of forested riparian bank will be permanently lost as a result of rip-rap placement along the banks of the creek. This loss adversely impacts the habitat afforded fish as they swim through the affected stretch. To offset this impact, the Corps is proposing to improve fish passage by removing Boone’s Dam on Fishing Creek about one mile downstream from the project area. This will restore anadromous fish access to approximately four miles of lower Fishing Creek and would reconnect that habitat reach with the Susquehanna River. This equals approximately 48 acres of river habitat for fish and other aquatic organisms.

Environmental Operating Principles. The recommended plan supports each of the seven USACE Environmental Operating Principles. Developing alternatives that were *sensitive to environmental effects* was key during the plan formulation process. The recommended plan strives to achieve *environmental sustainability* by implementing a project to provide a flood reduction project for Bloomsburg that significantly lessens the physical and environmental damage wrought by recurring flood events. While recognizing the economic benefits to be gained from flood protection, the NED plan has been developed to be *sustainable but sensitive to the balance and synergy between development and nature* through the use of USACE design criteria and guide specifications with an eye to reducing the amount of disruption to riparian habitats, keeping prime and unique farmlands as intact as possible, creating fish passage improvements in Fishing Creek to mitigate for disruptions to existing Creek stream bottom habitat and wetlands replacement. To minimize HTRW exposure, the NED alignment navigates around the boundaries of closed landfills to minimize the risk of surface water and groundwater contamination. During design, the alignment will be adjusted to avoid the landfills if the mapped boundaries do not coincide with the physical limits of the landfills. A water treatment plant (circa 1870) and electric substation were also identified as properties subject to more frequent flooding although they already experience flooding under existing “without project” conditions. The proposed mitigation calls for raising equipment above the with-project 100-year water surface elevation and refurbishing an additional water tank to increase storage capacity. An asphalt berm would be constructed inside the fence line of the substation to mitigate for increased flooding due to the project. In developing mitigation solutions, the study team coordinated and met on-site with multiple public resource agencies such as the Pennsylvania Department of Environmental Protection, the U.S. Fish and Wildlife Service, the Pennsylvania Fish and Boat Commission, the Pennsylvania State Historical Preservation Office *to build knowledge to understand environmental impacts* in order to collaboratively develop *innovative, win-win solutions that also protect and enhance the environment*. For each adverse effect identified, both temporary (such as noise and traffic) and permanent, a responsible mitigation or action to minimize the adverse effect will be implemented to reflect USACE commitment to *accept responsibility and accountability* for its actions.

Independent Technical Review. During the Study, the development of alternatives was reviewed, first by peers and followed by a review from functional team leaders to ensure that the process and information used was technically sound. The Study was not reviewed by a sister District because this requirement was not in effect at the time the FCSA was executed.

EXPECTED PROJECT PERFORMANCE

Project Costs. Table 2 presents the estimated project first costs at the October 2005 cost levels and interest rates to facilitate comparison of this project with other projects proposed for authorization.

Residual Flood Risk . On the Susquehanna River, the recommended plan has less than a 0.2% annual probability being overtopped during a 0.23% exceedence interval flood event (440-year event). On Fishing Creek, the recommended plan has a 0.53% annual probability of being overtopped during a 1% exceedence interval event (100-year event).

Table 2 - Project First Costs
Oct 2005 price level

Account & Item Description	Cost
02 Relocations	5,989,000
06 Fish & Wildlife Facilities	1,784,000
11 Levees & Floodwalls	23,320,000
18 Cultural Resources Preservation	553,000
TOTAL CONSTRUCTION COST	31,646,000
01 Lands & Damages	5,993,000
30 Preconstruction Engineering & Design	2,976,000
31 Construction Management	2,686,000
TOTAL PROJECT COST	43,302,000

Equivalent Annual Costs and Benefits. Table 3 provides a summary of benefits and costs for the NED plan.

Cost sharing. The estimated costs for the NED plan is \$43,302,000. Table 4 shows the apportionment of cost-sharing responsibilities between the Federal government and the non-Federal sponsor.

Project Implementation. Upon conclusion of the feasibility phase, the town of Bloomsburg and the Corps must enter into a design agreement to prepare project plans and specifications. The design phase will be followed by execution of a project cooperation agreement (PCA) by the Town and USACE, pending congressional authorization of construction. Prior to construction, the Town is responsible for securing all required real estate conveyances as part of meeting their minimum 35 percent cost-sharing requirement. PA DEP is fully committed to providing half of the Town's cost-sharing obligation. Following construction, the Town is responsible for all OMRR&R activities and costs. For the design and construction phases, the Town plans to form an authority with the requisite abilities to advance the project for the common good of the regional community.

Operation and Maintenance (O&M). O&M costs were estimated for the NED plan. Costs reflect work required to maintain the project such as slope protection (mowing, weed control, repair of eroded areas), inspection and maintenance for closure structures and drainage structures, inspection and maintenance for concrete structures and flood warning system, repairs, and annual inspections. Costs were estimated based on the anticipated conditions over a 50-year period of analysis. Annual O&M costs were estimated at \$185,300. Major repair and replacement costs are not included in this cost since the features of this project are considered to be durable items and, if properly maintained, will not require replacement during the period of analysis. O&M is a one hundred percent non-Federal Sponsor responsibility.

Table 3 - Project Economic Summary

(Oct 2005 price level, 50-year period of analysis, 5.125 percent discount rate)

COSTS	
Total Project Costs (does not reflect escalation)	\$ 43,302,000
Less: Adjustment for PL 91-646 Costs	- \$ 1,378,000
Interest During Construction	\$ 1,849,000
Total Investment Costs	\$ 43,773,000
Annualized Investment Costs	\$ 2,444,000
Annual Operations & Maintenance Costs	\$ 185,000
Total Average Annual Costs	\$ 2,629,000
BENEFITS	
Residential Damage Reduction	\$ 1,445,000
Non-Residential Damage Reduction	\$ 2,130,000
Transportation & Pub Infrastructure Damage Reduction	\$ 83,000
Additional Debris Removal Costs Avoided	\$ 20,000
Electric Utilities Damage Reduction	\$ 9,000
Flood Insurance Administrative Cost Savings	\$ 36,000
Total Average Annual Benefits*	\$ 3,723,000
Benefit to Cost Ratio (@ 7%, BCR = 1.1)	1.4
Net Benefits	\$1,094,000

*Average annual damages under without-project conditions equal \$4,601,000. The average annual residual damages for the recommended plan have been calculated at \$1,567,000.

Table 4 - Project Cost Sharing Breakdown

(Oct 2005 price level, 50-year period of analysis, 5.125 percent discount rate)

TOTAL PROJECT COST		\$ 43,302,000
Non-Federal Share (minimum 35%)		
5% Cash minimum	\$2,165,000	
100% LERRDs	\$11,982,000	
Cash Balance	\$1,009,000	
Non-Federal Share (35%) (35%)		\$15,156,000
Federal Share (65%)		\$28,146,000

Key social and environmental factors.

HTRW Potential. Limited HTRW investigations were conducted within the Fringe Alignment to identify potential constituents of concern, establish guidelines for the handling of material that may be generated during construction, and provide recommendations for later project phases.

Though elevated concentrations of heavy metals are present in the surface and subsurface soil along much of the proposed alignment, consultation with PA DEP indicate that the heavy metals that were detected are likely a local background condition. If no other regulated constituents are present, the soil would be considered uncontaminated from a regulatory perspective and may be used in an unrestricted manner as fill material for the project.

Due to its location adjacent to closed landfills, the material located in the vicinity of the railroad gate closure was further sampled and tested in October 2003. Results indicate that the material in this area may be disposed as non-hazardous waste at a permitted disposal facility. Nevertheless, based on past experience related to construction projects at similar sites, the limited sampling, and the heterogeneity typical of dumpsites, 25 percent of the total excavated volume in this area has been assumed to require offsite disposal as hazardous waste for cost-estimating purposes. This assumption offers a reasonable contingency to account for the range of material that may be encountered. As non-Federal project sponsor, the Town of Bloomsburg would be responsible for the response cost for any CERCLA regulated material that requires off-site disposal, an important non-Federal financial consideration as the project moves forward. The CERCLA HTRW response cost is estimated at \$895,600. This HTRW estimated cost would be a non-Federal responsibility that would be in addition to the cost-shared project recommended for authorization.

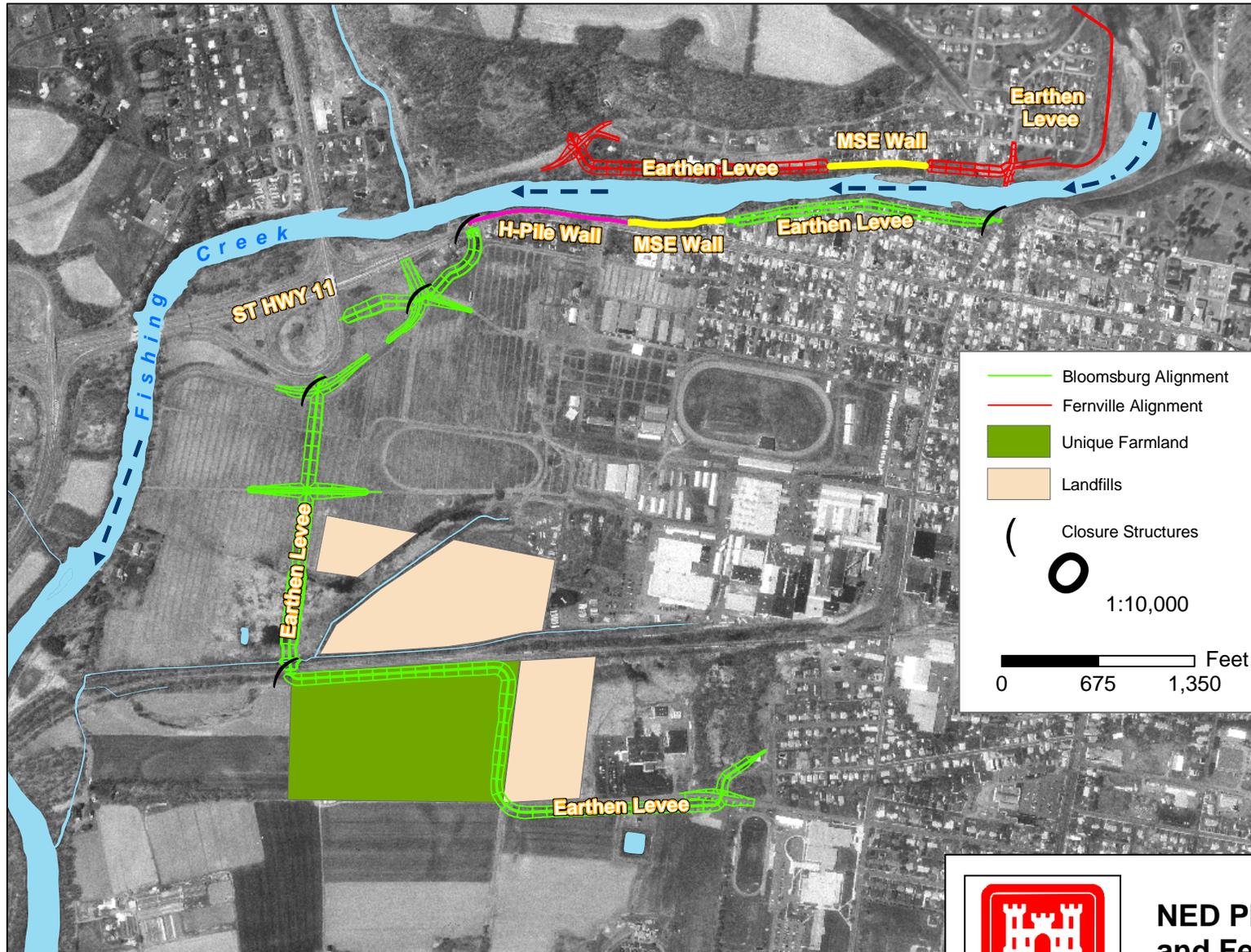
The material assumed to be non-hazardous waste between Stations 74+00 and 80+00 (75 percent of the total excavated volume) will be disposed offsite at an actively permitted Resource Conservation and Recovery Act (RCRA), Subtitle D disposal facility that is capable of accepting “residual waste” (defined by PADEP as non-hazardous industrial waste).

Section 106 compliance. The potential effects of the recommended plan are being coordinated with the Pennsylvania State Historic Preservation Officer (SHPO). Due to difficulties in securing rights-of-entry to dig test pits on a number of properties, a limited investigation was performed to evaluate the potential effects of the recommended plan on historic cultural and archaeological resources. Though no significant resources have been uncovered to date, due to the lack of more complete information, a programmatic agreement will be developed to address any additional requirements to implement the current proposal. This approach has been coordinated and concurred with by the Pennsylvania SHPO.

Stakeholder Perspectives and Differences.

Coordination with the public and public resource agencies. Public involvement was conducted in part through the publishing of a Notice of Intent in the Federal Register and holding information workshops and public meetings in Bloomsburg to discuss the project and receive comments. Additionally, coordination with resource agencies (to include the U.S. Fish and Wildlife Service, U.S. Environmental Protection Agency, the PA Natural Diversity Inventory, the PA Fish and Boat Commission, and the PA State Historic Preservation Office) was conducted through personal contact and coordination letters to solicit their input and expertise to assist in the development of solutions that are effective and responsible. Several of these agencies worked with the study team to develop potential solutions to improve fish passage as mitigation for the impact rendered by riprap placement.

Flexibility to extend and/or refine the tie-out locations. At public meetings, many residents in East Bloomsburg have expressed concern about why the NED Plan does not extend further to protect the residences and businesses of East Bloomsburg. As discussed previously, the East Extension Alignment was not economically justified. The town of Bloomsburg has also asked if the NED alignment can be extended to the Route 42 interchange and if the tie-out near the high school can be refined. During the design phase, refinements to the design will be considered, and if proposed changes provide positive enhancements, they will be considered for implementation.



NED Plan Alignment and Features

Bloomsburg, PA Flood Damage Reduction Feasibility Study